My name is Lyle Johnson. I have been employed professionally in the electronics and electronic communications industries for over 35 years. As an engineer, I have developed wireless data communications systems in use worldwide, in the HF, VHF and UHF spectra. Like many commenters in this proceeding, I am an Amateur radio operator, with an Extra class license. I have been a licensed Amateur operator for more than 39 years.

The original purpose of allowing low data rate "carrier current" communications on power utility wiring was to enable monitoring and control of the power distribution system.

The rise of the Internet over the last decade has spurred great public interest in data connectivity, and at ever-increasing data rates. Current technology allows Internet connection via dial-up phone service, DSL, digital cable and satellite. The power distribution utilities wish to provide Internet access as a legitimate means to bolster their revenue.

As a semi-rural resident, my present options for Internet access are dial-up and satellite. DSL and digital cable are presently unavailable to me. I have rejected satellite, in part due to cost, and in part due to the onerous restrictions placed on such access by the service providers. I currently use dial-up services. I would very much like faster access.

But not BPL.

BPL is bad engineering practice. In fact, it is terrible engineering practice.

Here's why.

The power transmission and distribution system was designed to efficiently provide multiple kilowatts of low-frequency AC power to a huge number of load points. It has been refined over many decades of experience. It does its intended job well.

It was not designed to carry radio frequency (e.g., "broadband") communications, and as a consequence it does so poorly. In fact, power lines are reasonably efficient antennas, that is, they radiate this energy. It is for this reason that there are requests before the Commission to increase the level of radiation allowed under BPL. Allowing such increases will help reduce the cost of deploying BPL, the proponents argue, because fewer repeater amplifiers will be required.

But the resulting radiation will be extremely disruptive to communications in the 2-80 MHz frequency range. Hundreds of commenters have pointed the Commissioners to the ARRL video that demonstrates how terrible this interference is in BPL test areas. It is inconceivable that the Commissioners will not have viewed this material during this comment period.

There is no argument that deploying BPL will be costly. While the transmission wires themselves may be used, amplifiers, bridges, end-user equipment and so forth must be manufactured and deployed. It is partially to reduce the cost of attempting to force the power transmission media to carry signals for which they were not designed, that the proponents of BPL are requesting a relaxation of the "unintentional radiator" limits. Clearly, they either **intend** to radiate, or recognize that this service will create large amounts of radiation, or they would not be requesting this increase.

This also raises the question of susceptibility to interference of BPL services by licensed emitters in the power grid. If the BPL system cannot reasonably contain its own signals, what will it do with received signals of fairly large amplitudes in the 2-80 MHz range?

Of course, it is easy to be opposed to something as invasive and disruptive as BPL.

What alternatives exist?

There is a cost-effective alternative to BPL available today to the power utilities. I suggest that power companies can provide cost-effective, broadband Internet access in a way that poses no interference problems. It may even cost less than BPL, and offers immensely improved bandwidth and capability. It is being demonstrated today to be cost-effective in rural areas and would thus be even more so in urban areas where BPL would be competing with already entrenched DSL and digital cable services.

The method I am suggesting is fiber optic.

Since I cannot provide a link to the web in a comment, I quote from the website of the University of Washington's Center for Internet Studies:

> In 2000, Washington State, Governor Gary Locke signed into law SB 6675 which empowers public utility districts (PUDs) to extend fiber optic Internet connections to homes and businesses in their local service areas. The bi-partisan support for this important legislation emphasized the need to give local communities the essential tools and platforms for future economic development, especially in high-value knowledge industries. 17 PUDs across Washington are moving forward with innovative projects to construct high-performance fiber optic backbones in under served areas of Washington. Support by US Rep. Norm Dicks has been instrumental in allowing public purpose fiber to be leased by the Bonneville Power Administration to the Northwest Open Access Network (NOANET) for the regional build-out of their OC-192 WDM backbone.
>
> In Grant County, over 6000 homes and businesses are in the process of being connected to the gigabit Internet via Grant County PUD's Zipp Net. The Zipp Net is the wholesale access platform for 11 competitive super Internet service providers (ISP). These ISPs retail an array of value added services directly to consumers and businesses such as video on-demand, voice over IP, and web services. While some telecom firms claim that most end users would never use more than 1mb of bandwidth on average, in Grant County, burst traffic averages 20-40mb for around $50 per month. Gigabit Ethernet and other disruptive technologies are making optical residential connections to the Internet a reality today. As a result of the PUD investment, many Grant County residents are bullish about their economic future since they boast one of America's best locally controlled networks. Through these strategic public private investments, rural Washington State and

future generations will be well positioned to take advantages of opportunities not yet defined.

This system is already providing high-speed Internet and other digital services, by the power utility companies, using the power utility infrastructure, in a rural setting

I believe this alternative to BPL technology demonstrably:

1) offers a better solution than BPL for the public desiring alternative broadband access to the Internet by providing truly broadband access with such features as interactive TV which can not be handled in the limited bandwidth of BPL;
2) allows the power distribution utilities to provide a high-speed data backbone to carry contracted data services;
3) represents good engineering practice. In fact, it is excellent engineering practice.

If in spite of good engineering practice, BPL must be allowed or encouraged, I suggest the radiation limits from 2-30 and 50-54 MHz be reduced by a factor of at least 100 from levels permitted today.

Why?

The present levels are designed for point-source unintentional radiating devices, such as local oscillators in broadcast receivers or clock oscillators in computers. They are neither designed for, not account for, systems with attached antennas that are ubiquitous and pervasive. When the regulations were promulgated, carrier current communications were narrowband, and confined to a region in the 50 to 400 kHz range, where they could reasonably be propagated over the power transmission infrastructure for control and monitoring purposes.

I also suggest the BPL services have their baseband waveform shaped in such a way that the majority of energy be concentrated in the 0.5-1.7 MHz, 30-50 MHz and 55-135 MHz areas. If the interference to existing services is as mild as the BPL proponents assert, they will embrace this proposal because it offers even more bandwidth than the 2-80 MHz range, does not concentrate energy in areas where long-range propagation is likely to occur (commonly called HF, from 3 to 30 MHz) and is not in areas of spectrum that are commonly used for weak-signal operation.

Finally, I request that any report and order that may result form this inquiry squarely and unambiguously state that the BPL service providers are responsible for any disruptive interference to licensed users of the spectrum from their systems *even if the BPL system meets the then-current radiation limits* and that they are further *completely responsible for any and all disruptions to the BPL service from emissions by licensed users of the radio spectrum and must hold all such licensed users harmless, and indemnify such users against any lawsuits which may arise from BPL subscribers experiencing disruption of their BPL service by licensed emitters*.

I am confident that the Commission, after reviewing all comments, seriously considering the disruptive interference issues, recognizing the susceptibility of BPL to the thousands of licensed radiators that are immersed in the power grid, and examining the alternatives such as those referenced above, will realize that BPL for Internet access is a seductive siren song, epitomizing bad engineering practice and terrible public policy.

Respectfully submitted,

Lyle Johnson